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ABSTRACT

This project involves devising and evaluating a sales tax schedule to meet the specific revenue needs of a hypothetical state in the United States. Conducting this unit involves many mathematical skills in a learning environment familiar to the student. The essential parts of the project consist of student preparation of a tax schedule and class participation in evaluating the proposals of others. Mathematical operations involve arithmetic computations (including computation of percent), construction of tables, formulae, rounding, graphing, and employment of random numbers. (Author/MK)

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PROJECT MODULE FOR USE

IN A

MATHEMATICS LABORATORY SETTING

PROJECT: SALES TAX

by

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A Publication
of
University of Denver
Mathematics Laboratory
Regional Center for
Pre-College Mathematics

Dr. Ruth I. Hoffman, Director

Materials:

Filmstrip and tape
Student cards
Student worksheets
Grid for overhead
Colorado tax table

SE 030 313

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OBJECTIVES:

.Given background information and data in the form of film strips, news articles, tax schedules and advertisements the student will demonstrate knowledge of how sales taxes are enacted into legislation and how they are computed on purchases.

.Given data on available revenue sources and the required amount of money to be raised through taxation, the student will acquire or demonstrate proficiency in mathematical skills necessary for the formulation of alternative tax schedules.

.Given access to resource personnel, legislators, merchants, consumers, etc. the student will acquire knowledge about principles of taxation which will assist him in making value judgements about tax proposals.

.Given tables of random numbers and computer programs the student will evaluate his alternative tax schedules and assemble supporting documentation and visual aids for presentation of a single proposal to his classmates.

Successful completion of this project is approval of the student's tax proposal by his classmates.

INTRODUCTION

This project involves devising and evaluating a sales tax schedule to meet the specific revenue needs of a hypothetical state in the U.S. Conducting this unit involves using many mathematical skills in a learning environment familiar to the student. The essential parts of the project consist of student preparation of a tax schedule and class participation in evaluating the proposals of others. Mathematical operations involve arithmetic computations (including computation of percent), constructions of tables, formulae, rounding, graphing, and employment of random numbers. Suggested procedural steps which are listed on the student project sheet are discussed more fully below. The ability of the student to identify with a real problem of social concern is a key to success in this unit.

If you have students who do not understand percent (or even simple arithmetic skills), graphing, etc., this unit will provide an opportunity to build such skills naturally, particularly if students are motivated by the task to learn what they need to do to accomplish it. Encourage students to assist each other.

Depending upon the level of the class, play money could be very helpful for understanding a percent sales tax on the dollar.

THE SOCIAL AND ECONOMIC ASPECTS OF A SALES TAX

The sales tax is an important factor in the life of most citizens. The schedules employed, the item on which the tax is applied, the amounts, etc., all vary widely in different areas. Your local revenue department can furnish prepared tables and perhaps even a rationale for the

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particular schedule. Attempting to identify the formula used in preparing the schedule employed can be an interesting task. As an example, consider the sales tax schedule for the State of Colorado which is enclosed. Purchases from 0¢ - 18¢ are exempt on the Colorado 3% schedule; 19¢ - 51¢ purchases pay 1¢; 52¢ - 84¢ purchases pay 2¢ and 85¢ - $1.18 pay 3¢. It would appear that these divisions were chosen so that the product of the purchase and 3% included a remainder greater than .0055; e.g. 3% of .18 = .0054 (no tax) while 3% of .19 = .0057 on which the tax is 1¢.

Another aspect of the sales tax is the yield, which theoretically could vary from 0 (if all purchases were individual ones below the minimum on the schedule) to the maximum, for which all purchases are individual ones, each of an amount equal to the minimum amount taxed. The fact that the variable doesn't take on these extreme values is of course due to the randomness of the amounts of the purchases. The random nature of purchases suggest questions of estimation, administration and collection of this tax.

As an example, what are the real problems that a merchant might encounter? Having local merchants talk to the class on problems which they have encountered in administering and collecting the tax could provide students with an awareness of other factors to be considered in devising a tax schedule.

While the mathematical aspects of the problem are of interest, the social implications of this particular tax are great. Resource persons who might be called in for background discussions include members of the legislature, consumer groups, and merchants. Perhaps the project might be conducted jointly with civics or political science classes.

The time which you may wish to allot to this unit is, of course, dependent upon the depth of involvement. As outlined it might take only 4 or 5 class periods, but it is rich enough in its implications to last longer.

BACKGROUND DATA FOR STUDENT ACTIVITY

As a minimum, the data furnished the student should include the amount of revenue to be raised by the sales tax and some breakdown of the gross sales in the state that will involve the student in value judgements as to which goods or services should be taxed. An alternative and recommended method of providing the background data is to have the students gather data on their

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own state's financial status. Data of this nature would be especially meaningful to the class and could lead to further investigations involving basic mathematical skills.

THE DIAGNOSTIC AND POST TESTS

The diagnostic test, included in the module, should identify entry skills which students may lack. We do not recommend that you spend time teaching such skills in advance of the unit for a number of reasons: 1) the unit is designed to develop motivation 2) it is educationally sound to build skills when they are needed and 3) students will help each other to learn needed skills. The latter is a good reason for scheduling group activity when possible during the unit. The post-test should give some idea of skill development and retention. Of course, the motivation of the students is of great importance and an attempt is made to test motivation in the post-test.

The success of the unit will depend also a good deal upon your enthusiam, class management and creativity as well as the students themselves.

If additional skills were included in the unit, please append pertinent items to the post-test.

THE NATURE OF THE STUDENT'S TASK

It is recommended that students work in

teams, say of four students, each team to devise an equitable sales tax. The filmstrip-cassette presentation should precede the student activity and serve as an introduction to the task. Depending upon the nature of your particular class, you may want to distribute the student project sheet immediately after the filmstrip presentation or give additional background to prepare students for this activity. A guest speaker might be of assistance before the project is pursued.

During student activities, problems will probably arise which require technical advice. This is the time to call an expert to speak to the class on issues which you know will be interesting to the students.

Procedure: The first task of each group is to meet and devise a sales tax schedule which it feels best meets the need of the state. Each group should then present its schedule and defend it. If possible, encourage and assist students in using media for their presentations; overhead projectors, graphs, charts, histograms, etc.

Simulating Purchases: As pointed out before, the amount of revenue which can be produced depends upon the amounts of the purchases, and

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these are random. While a solution might be obtained by a simple application of a formula, the experiment offers an excellent opportunity to simulate the random purchases.

Computer: If the class has access to a computer, a computer program such as the one included (written in the BASIC language) could be used to generate the random purchases. This program computes the actual amounts collected in taxes versus the expected amounts for two competing tax schedules. The program was written for a Burroughs B5500 so modifications to the program may be required for different computers.

Random Numbers: Whether a computer is available or not, it is recommended that students prepare lists of random purchases to be used in evaluating competing tax schedule proposals. A table of random numbers has been included in the module for this purpose.

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ANSWERS

SALES TAX

Card #3

Tax for one bottle of Lavoris	$ .02
Tax for ten bottles of Lavoris	.24
Tax for ten bottles purchased separately	.20
Tax is higher when buying ten bottles at once	
Tax for one soldering gun	.17
Tax for ten soldering guns	1.67
Tax for ten soldering guns purchased separately	1.70
Tax is higher when buying ten soldering guns separately.	
They are not the same because of the division points.	

Card #3B

Item	Price	Tax
Red Heart Yarn	$ .77	$ .02
Lavoris	$ .79	$ .02
'68 Porsche 912	$3,695.00	$110.85
'62 Porsche	$2,295.00	$ 68.85
'70 VW Squareback	$1,495.00	$ 44.85
'68 Olds Cutlass	$1,150.00	$ 34.50
'62 Chevrolet Pickup	$ 795.00	$ 23.85
'64 VW Bug '62 VW Bus	$ 695.00	$ 20.85
'67 VW Squareback	$ 595.00	$ 17.85
Soldering Gun	$ 5.57	$ .17

SALES TAX (Card #6)

1% of $1,000,000,000 is $10,000,000

Answers are for Colorado Tax Table:

1) Round up to the next cent if 3% of the purchase has a remainder which exceeds .0055.

2) Yes, so that the amount of tax for purchases less than a dollar will be fair and consistent.

3) Yes, in graph form, or as a formula.

4) The owner of a small variety store, since his items are more likely to have smaller prices. For instance, if a sale is 75¢, it is important whether 1¢ or 2¢ tax is charged, while it is not as vital when a $5,000.75 car is purchased.

SALES TAX (Card #6.1)

It is necessary to take the stated precautions to insure that we get a fair sample of purchases.

Real purchases over an entire economy exhibit randomness.

Column (a) is computed by $.01 times the last two digits of the random number.

Column (b) is computed by $.01 times the first two digits of the random number.

Column (c) is computed by $.01 times the last three digits of the random number.

Column (d) is computed by $.01 times the last four digits of the random number.

Column (e) is computed by $.01 times the middle three digits in reverse order.

SALES TAX (Card #9)

Information which can be gained from the graph include:

.amount of tax on a given purchase under $2.

.location of the divisions.

The percent of tax can be determined by looking at the tax on $1, which is 3 cents - so, the tax rate is 3%.

A. 1. $19.01
2. 60
3. $10.55
4. $19.629 or $19.63
5. $ 2.1708 or $2.17

B. 6. 5
7. 4.5
8. 50
9. 33.3

C. 10. .10
11. .06
12. .667

D. 13. $ 1.59
14. .09
15. 12.50
16. 3.18
17. .80
18. 1.01

E. 19. $ 5.00
20. 26.00
21. 2.00
22. 0.00
23. 5.00
24. 1.00

F. 25. $ .01
26. .06
27. .08
28. .00
29. .17
30. 2.03
31. 1.00
32. 83.59

G. 33.

$ .01	$ .16
.02	.51
.07	1.83
.02	.41

H. 34. 120,000,000
35. 112,500,000
36. 560,000,000
37. 262,500,000

I. 38. 2%
39. 4%
40. 3%
41. 5%

ANSWER

Diagnostic Test

A.
1. $17.31
2. 14.01
3. .1497 or $.15
4. 2.16
5. 1.0464

B.
6. 6%
7. 3%
8. 1.25%

C.
9. .16
10. .05
11. 4.5

D.
12. .64
13. 1.5743
14. 1.3293

E.

	Nearest dollar	Nearest 10¢
15.	$ 6.00	$ 6.30
16.	20.00	19.70
17.	1.00	.80
18.	2.00	2.00
19.	10.00	9.50

F.
20. $ 3.49
21. .07
22. 11.24
23. .01
24. 4.38

G.
25. $ .02
26. .12
27. .06
28. .18
29. .20
30. .46

H.

Amount of Sale	Tax
$ .01 to .24	$.00
.25 to .74	.01
.75 to 1.24	.02
1.25 to 1.74	.03
1.75 to 2.24	.04
2.25 to 2.74	.05
2.75 to 3.24	.06
3.25 to 3.74	.07

I.
31. Income, luxury, property
32. Income
33. Property
34. Sales
35. Sales

DIAGNOSTIC TEST

MATHEMATICS OF SALES TAX

A. Perform the indicated operations.

1.
$$\begin{array}{r} \$\ 4.61 \\ \$11.16 \\ \$\ .05 \\ +\ \$\ 1.49 \\ \hline \end{array}$$

2. $\$1.69 + \$.15 + \$12.17 =$

3.
$$\begin{array}{r} \$4.99 \\ \times\ .03 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 18 \\ \times\ .12 \\ \hline \end{array}$$

5. $17.44 \times .06 =$

B. Change the following decimals to percentages.

6. $.06 =$ ____ %
7. $.03 =$ ____ %
8. $.0125 =$ ____ %

C. Change the following percents to decimals.

9. $16\% =$ _____
10. $5\% =$ _____
11. $4.5\% =$ _____

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Diagnostic Test (Cont'd)

D. Solve

12. 16 x 4% =

13. 22.49 x 7% =

14. $44.31 x 3% =

E. Using the rule : If the digit to the right of the place to be rounded is 5 or more increase, if 4 or less leave the same.

	Round to the nearest dollar	Round to the nearest 10¢
15.	$6.25 _____	_____
16.	$19.74 _____	_____
17.	$ .81 _____	_____
18.	$1.95 _____	_____
19.	$9.53 _____	_____

F. Round to the nearest cent.

20. $ 3.492 _____

21. $ .065 _____

22. $11.237 _____

23. $ .0096 _____

24. $ 4.38124 _____

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Diagnostic Test (Cont'd)

G. Given the following sales tax table, compute the total state and city tax on each purchase.

Amount of Sale	Colorado	Denver	Total
$.01 to .18	$.00	$.00	$.00
.19 to .51	.01	.01	.02
.52 to .84	.02	.02	.04
.85 to 1.18	.03	.03	.06
1.19 to 1.51	.04	.04	.08
1.52 to 1.84	.05	.05	.10
1.85 to 2.18	.06	.06	.12
2.19 to 2.51	.07	.07	.14
2.52 to 2.84	.08	.08	.16
2.85 to 3.18	.09	.09	.18

25. $ .50 _____

26. $1.86 _____

27. $1.18 _____

28. $2.99 _____

29. $3.50 _____

30. $7.69 _____

H. A city has the following tax table. Items costing 24¢ or less have no tax. Items costing 25¢ thru 74¢ are taxed 1¢, items costing 75¢ thru $1.24 are taxed 2¢, items costing $1.25 thru $1.74 are taxed 3¢. Construct a table like the one above from $.01 thru $3.74 showing the tax assessed in each interval.

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Diagnostic Test (Cont'd)

I.

31. Give an example of a tax which you consider as based upon ability to pay.

32. A tax based upon the wage earner's salary is called a(n) _____ tax.

33. A tax placed upon an owner's home is an example of a(n) _____ tax.

34. A tax levied upon a purchase from a clothing store is called a(n) _____ tax.

35. Give an example of a tax which is not based upon ability to pay.

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POST TEST

THE MATHEMATICS OF SALES TAX

A. Perform the indicated operations.

1. $.69 + $.49 + $1.15 + $.39 + $15.00 + $1.29 =

2. 3,000,000,000 ÷ 50,000,000 =

3. $211 x .05 =

4. $327.15
x 6%

5. $48.24
x .045

B. Change the following decimals to percentages.

6. .05 = %
7. .045 = %
8. .50 = %
9. .333 = %

C. Change the following percentages to decimals.

10. 10% = ____
11. 6% = ____
12. 66.7% = ____

D. Round to the nearest cent.

13. $1.594 ____
14. $ .085 ____
15. $12.495 ____
16. $3.1762 ____
17. $ .798 ____
18. $1.009 ____

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Posttest (Cont'd)

E. Round to the nearest dollar.

19. $ 4.75 _____
20. $26.49 _____
21. $ 1.50 _____
22. $ .49 _____
23. $ 5.00 _____
24. $ .87 _____

F. Using the following tax table calculate the tax on each purchase.

Amount of sale in dollars	Tax (in dollars)
$.01 to $.12	$.00
.13 to .37	.01
.38 to .62	.02
.63 to .87	.03
.88 to 1.12	.04
1.13 to 1.37	.05
1.38 to 1.62	.06
1.63 to 1.87	.07
1.88 to 2.12	.08

25. $ .15 _____
26. $1.49 _____
27. $1.88 _____
28. $ .10 _____
29. $4.19 _____
30. $50.64 _____
31. $25.00 _____
32. $2089.65 _____

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Posttest (Cont'd)

G. Using the tax table in F, complete the table below:

	Purchases In Dollars	Tax In Dollars	Total Price In Dollars
33.	.15	____	____
	.49	____	____
	1.76	____	____
	.39	____	____

H. What would be the total annual revenue raised by assessing the following rates on the indicated totals?

34. 3% on $4,000,000,000
35. 4½% on 2,500,000,000
36. 7% on 8,000,000,000
37. 5½% on 5,000,000,000

I. What percent tax is needed to raise the following amounts on the indicated goods and services? (Round the answer to the nearest %)

	Funds needed	Goods and Services	% Tax
38.	50,000,000	3,000,000,000	____
39.	480,000,000	12,000,000,000	____
40.	264,000,000	8.8 billion	____
41.	50,000,000	1,000,000,000	____

J. Circle the number which best gives your feelings. All questions concern the sales tax unit.

42.	Not much		O.K.		Very Good
Liked working on sales tax	0	1	2	3	4

43.					
Think I learned some new mathematics.	0	1	2	3	4

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Posttest (Cont'd)

44.	Not Much		O.K.		Very Good
Think I learned important ideas not in mathematics	0	1	2	3	4

45. Suggestions to make the unit better: _____

_____

_____

_____

SAME BREAKING POINTS

Sales-Tax Picture 'Confusing'

If you spend more, you save, and if you spend less, you lose.

That's part of the confusing sales-tax picture in Denver, with identical city and state sales taxes of 3 per cent, each carrying the same breaking points.

A customer at the Sky Chef coffee shop at Stapleton International Airport complained that he and a companion each had 55-cent checks instead of having one check for $1.10, and as a result paid more sales tax. Why, he asked, couldn't the checks be combined?

TOUGH TO COMBINE

Arnold Patterson, coffee shop manager, explained that a moving belt system is used in filling orders. Since the orders are made up by machine in different areas, it would be difficult to combine the checks.

Besides, he said, using the example given, the customer really paid a penny less for two 55-cent checks than he would have for one check for $1.10. Each of the smaller checks, he said, require a two-cent tax, a total of four cents. The larger check would require a six-cent tax.

On smaller items, however, a consolidated check would save some tax. For example, Patterson said, the tax on a 20-cent cup of coffee would be two cents, and for two cups on separate checks a total of four cents. On a single check for 40 cents the tax would still be two cents.

BREAKING POINTS

These are the breaking points: On purchases up to and including 18 cents, there is no tax. From 19 to 51 cents the tax is two cents (one cent city and one cent state). From 52 to 84 cents the tax is four cents and from 85 cents to $1.18 the tax is six cents. Beyond $1.18 the cycle repeats itself.

No matter what the tax, almost all of it goes to the city and state. For collecting the tax the merchant gets 2 per cent of the city tax and 3⅓ per cent of the state tax.

THE DENVER POST Thurs., May 3, 1973

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SALES TAX

View the filmstrip on sales tax.

What are some of the reasons for a sales tax?
What are some of the problems involved in selecting a tax?
(Use Form 2A to list your answers.)

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Reasons for a sales tax.

Difficulties in assessing the tax.

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SALES TAX

Examine a copy of your State's sales tax schedule. (If you don't have one, use the Colorado tax schedule, 3.1, which is on the reverse side.)

Compute the tax on the items in the advertisements. Use Form 3C.

Use the Colorado tax schedule to determine the following:

What is the tax for one bottle of Lavoris? For 10 bottles? For 10 bottles purchased separately? Which is higher?

What is the tax for 1 soldering gun? For 10 soldering guns? For 10 soldering guns purchased separately? Which is higher?

Why are the taxes above not the same?

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DEPARTMENT OF REVENUE
State Capitol Annex
Denver, Colorado 80203

COLORADO STATE RETAIL SALES AND USE TAX SCHEDULE

Sales Price				*Tax Due*
$ .01	to $ .18	Inc.		$ .00
.19	to .51	Inc.		.01
.52	to .84	Inc.		.02
.85	to 1.00	Inc.		.03

On sales in excess of one dollar, the tax shall be three cents on each full dollar of the sales price, plus the tax shown in the above schedule for the applicable fractional part of a dollar of each such sales price.

$1.01	to $ 1.18	Inc.		$ .03
1.19	to 1.51	Inc.		.04
1.52	to 1.84	Inc.		.05
1.85	to 2.18	Inc.		.06
2.19	to 2.51	Inc.		.07
2.52	to 2.84	Inc.		.08
2.85	to 3.18	Inc.		.09
3.19	to 3.51	Inc.		.10
3.52	to 3.84	Inc.		.11
3.85	to 4.18	Inc.		.12
4.19	to 4.51	Inc.		.13
4.52	to 4.84	Inc.		.14
4.85	to 5.18	Inc.		.15
5.19	to 5.51	Inc.		.16
5.52	to 5.84	Inc.		.17
5.85	to 6.18	Inc.		.18
6.19	to 6.51	Inc.		.19
6.52	to 6.84	Inc.		.20
6.85	to 7.18	Inc.		.21
7.19	to 7.51	Inc.		.22
7.52	to 7.84	Inc.		.23
7.85	to 8.18	Inc.		.24
8.19	to 8.51	Inc.		.25
8.52	to 8.84	Inc.		.26
8.85	to 9.18	Inc.		.27
9.19	to 9.51	Inc.		.28
9.52	to 9.84	Inc.		.29
9.85	to 10.18	Inc.		.30

and etc.

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MOTH PROOF

77¢ Not at Downtown

Assorted Shades
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Mouth Wash
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ITEM	PRICE	TAX
	30	

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As a member of the state legislature of Richland, you have been asked to raise $50,000,000 in extra revenue annually by means of a state sales tax.

The total amount of money expended upon goods and services within the state is $3,000,000,000 annually, any portion of which could be legally taxed.

The breakdown is:

1,000,000,000	Services (Health, Sanitation, Labor for Auto Repair, Etc.)
600,000,000	Food
200,000,000	Agricultural Equipment
300,000,000	Manufacturing Equipment
900,000,000	Retail goods

Form a taxation committee to discuss various possible tax rates, divisions, and taxable items.

Your committee, after due consideration, will submit its proposal to the legislature.

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SALES TAX

Representatives in the legislature are responsible to all elements of society and are, therefore, interested in a fair tax.

What is a fair tax?

Should all persons, regardless of income, be taxed the same?

Is it fair to tax food?

Should all foods be taxed?

Should all grocery store items be taxed? (Example: toothpaste, aspirin, greeting cards, etc.)

Develop reasons for choosing which items are to be taxed. (Remember - $50,000,000 needs to be raised.)

Select a secretary for the committee to record your decisions on these questions.

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SALES TAX

Sales taxes are usually expressed in percentages of one dollar (or number of cents on a dollar). The first task of the legislature is to determine how much tax should be charged in order to raise the necessary revenue. If the amount of sales which can be taxed is $1,000,000,000, how much revenue would you expect a 1% sales tax to raise?

Once a percentage has been agreed upon, it is customary to prepare tax schedules (tables) which divide amounts of purchases into divisions to make it easier to compute the tax. Examine the tax schedule in your state or the Colorado tax return on Card #3.1.

1) How do you think the divisions were arrived at?
2) Are tax divisions essential?
3) Could the information on a tax schedule be presented in any other way?
4) Who is more likely to be concerned with the divisions on a tax schedule, the owner of a small variety store of the owner of an automobile sales firm?

Your next assignment will be to devise a tax schedule and also a scheme to evaluate it. But first, read Card 6.1 for suggestions on how to assemble a list of purchases.

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When computing the effectiveness of your tax schedule you will want to be sure that your purchases are random. Random means that the size of a purchase is independent of ones that precede or follow it, and the amount of each purchase is as likely as any other amount. Why is it necessary to take these precautions? Do real purchases follow this scheme?

A random number table may be used to generate a list of purchases. A sample table of random numbers appears on the back of this card. Since each number, as well as the digits of each number, are random entries you can use the tables in many ways. Here are sample lists of purchases. Can you determine how they were obtained?

SAMPLE TABLE OF RANDOM NUMBERS

	Lists of Random Purchases				
	(a)	(b)	(c)	(d)	(e)
05132	$.32	$.05	$1.32	$51.32	$3.15
19614	.14	.19	6.14	96.14	1.69
28037	.37	.28	.37	80.37	3.08
42176	.76	.42	1.76	21.76	7.12
51432	.32	.51	4.32	14.32	3.41
19628	.28	.19	6.28	96.28	2.69

A table of random numbers appears below.

011	182468	093596	560974	422311	904743
722	106247	636759	816414	169805	362041
924	640545	840726	038645	351549	892936
074	960241	754917	584376	388282	231639
414	757653	540776	240994	855371	142719
056	837713	020585	123404	663092	444349
020	554103	320563	923017	432657	739613
915	736683	415097	487750	187360	531827
398	201054	204983	225525	534002	923350
757	742585	480484	699560	215366	369643
901	932674	589704	534229	165166	194410
660	581462	185242	750625	209209	201759
194	544872	265543	521475	986653	498671
909	541446	245018	468430	265446	544856
333	169639	017907	107358	539006	807415
655	784270	780296	197024	856112	643413
256	010138	060796	364392	083799	180833
278	669518	018765	075339	102157	183897
713	395319	369244	212976	706268	451553
030	609813	654743	984019	656747	276434

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Preparation of Tax Schedules
(Random Number Table)

1. Determine percent tax required to raise revenue desired.

2. Construct various alternative tax schedules.

3. Evaluate effectiveness of competing tax schedules.

   (a) Form 7A has been prepared to assist you in your evaluations. The example shown is not a recommended tax, but was purposely chosen to illustrate the effect that tax divisions can have on small purchases.

   (b) Using the table of random numbers to compile a test list of purchases, evaluate as many different schedules as you desire until you are satisfied that your tax will meet its design requirements. It is suggested that you first test your tax on purchases under $1. If your tax yields the desired revenue when tested on items costing $1 or less, could you be confident it will be effective on larger purchases?

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EVALUATION OF TAX SCHEDULE

EXAMPLE

TAX RATE IN %

3%

TAX	RANGE
0¢	$.00 - .30
1¢	.31 - .55
2¢	.56 - .80
3¢	.81 - 1.30
—	———
—	———

	Purchase	Tax Collected
1.	$.74	$.02
2.	.14	.00
3.	.45	.01
4.	.78	.02
5.	.94	.03
6.	.04	.00
7.	.17	.00
8.	.80	.02
9.	.28	.00
10.	.60	.02
11.	.29	.00
12.	.28	.00
13.	.78	.02
14.	.30	.00
15.	.52	.01
16.	.24	.00
17.	.92	.03
18.	.39	.01
19.	.76	.02
20.	.19	.00
Total	$9.61	$.21
(a) Total Purchase		
Tax Rate	___	.29
Difference (a)-(b)		-.08

TAX SCHEDULE

1

TAX RATE IN %

TAX	RANGE
—	———
—	———
—	———
—	———
—	———
—	———

Purchase	Tax

Preparation of Tax Schedules
(Computer)

You can use the prepared computer program to quickly evaluate two competing tax schedules. The computer program also enables you to look at many more random purchases than you could using the random number table.

The prepared program will:

- .generate lists of random purchases.
- .compute the tax on each purchase under each schedule.
- .compute the total of purchases and the amount of tax collected, and the amount of tax expected under each schedule.

In order to use the program, you must be prepared to enter the following items:

- Percent of tax (for each schedule)
- Tax divisions (for each schedule)
- Amount of largest purchase
- Number of purchases

You may use Form 8B to organize the results of your alternative tax schedules.

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```
100 FOR L=1 TO 2
200 PRINT "TAX SCHEDULE #";L
300 PRINT "TAX RATE IN PERCENT";
400 INPUT R(L)
500 LET R=R(L)
600 PRINT "MAXIMUM AMOUNT (IN CENTS) FOR NO TAX";
700 INPUT X(L,1)
800 LET X(L,1)=X(L,1)/100
900 FOR I=2 TO R
1000 PRINT "MAXIMUM AMOUNT (IN CENTS) FOR";I-1;" CENTS TAX";
1100 INPUT X(L,I)
1200 LET X(L,I)=X(L,I)/100
1300 NEXT I
1400 LET X(L,R+1)=1
1500 LET B(L)=0
1600 PRINT
1700 NEXT L
1800 PRINT "SIZE OF LARGEST PURCHASE";
1900 INPUT D
2000 PRINT "NUMBER OF PURCHASES";
2100 INPUT K
2200 PRINT
2300 LET S=0
2400 LET P=RND(-.5)
2500 PRINT "PURCHASE","SCHEDULE #1","SCHEDULE #2"
2600 FOR J=1 TO K
2700 LET P=INT(RND(0)*D*100)/100
2800 PRINT
2900 PRINT P,
3000 LET M=INT(P)
3100 LET A=P-M
3200 FOR L=1 TO 2
3300 LET T=M*R(L)/100
3400 FOR I=1 TO R+1
3500 IF A<=X(L,I) THEN 3700
3600 NEXT I
3700 LET T=T+(I-1)/100
3800 PRINT T,
3900 LET B(L)=B(L)+T
4000 NEXT L
4100 LET S=S+P
4200 NEXT J
4300 PRINT
4400 IF Y=1 THEN 5400
4500 PRINT "TOTAL OF PURCHASES";S
4600 PRINT
4700 PRINT "TAX COLLECTED",B(1),B(2)
4800 LET P=S
4900 LET Y=1
5000 PRINT "TAX EXPECTED"
5100 PRINT "ON TOTAL OF"
5200 PRINT "PURCHASES",
5300 GO TO 3000
5400 END
```


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x Schedule								
Rate in %								
ximum Amount No Tax								
ximum Amount 1¢								
ximum Amount .¢								
ximum Amount 3¢								
ximum Amount 4¢								
ximum Amount 5¢								
ximum Amount 6¢								
al Purchases								
Total Purchases x Tax Rate								
Tax Collected								
Ferences (a) (b)								

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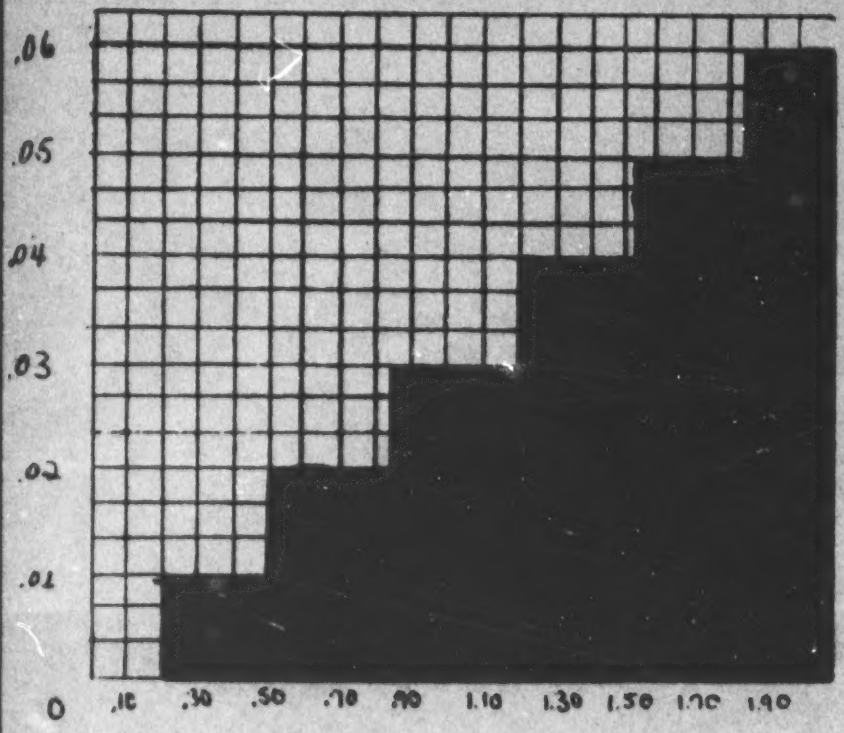
SALES TAX

Look at the histogram of the Colorado tax divisions.



What information can be gained from the graph?

Can you determine the percent of tax from the graph?

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SALES TAX Presentation

After you have decided upon a tax rate and a schedule which you believe will both raise the revenue and be acceptable to the legislatures, you must prepare supporting and explanatory material.

Suggestions for Inclusion

.Copy of your tax schedule
Your table must be readable and you should give thought to the range of purchases included.

.Tax rate and evidence that it will raise the necessary revenue.

.List of items to be taxed and reasons.

.Supporting graphs (you may use the acetate included for the overhead projector.)

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